Integrated Installation Planning: Technology for Sustainable Installations

ERDC/CERL TN-02-2 rev. September 2003

Background

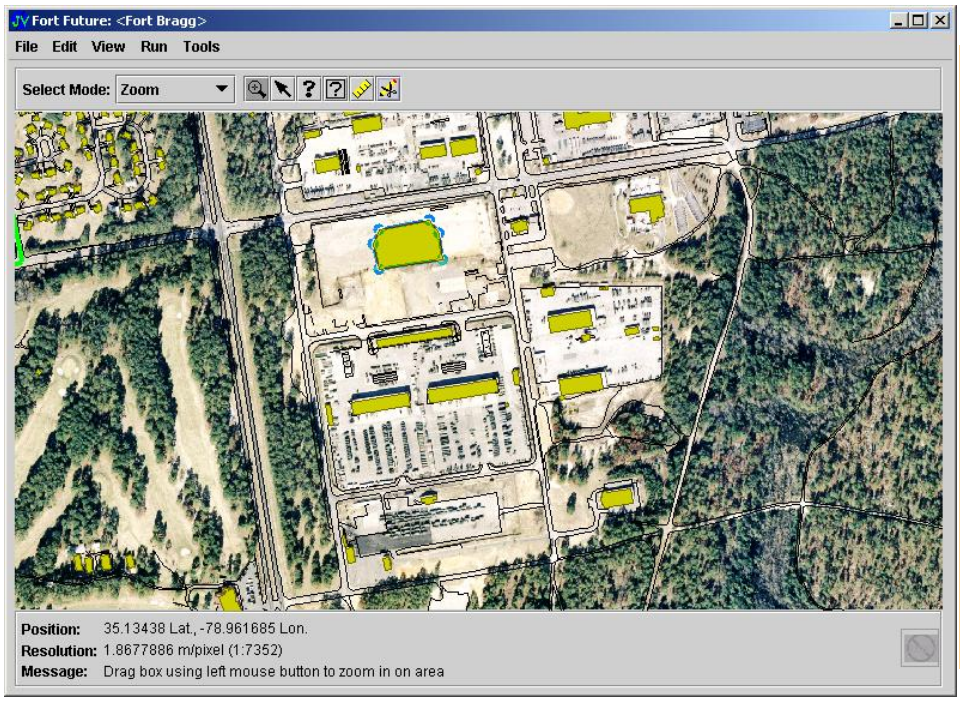
The Fort Future Tools research program is building installation modeling and simulation capabilities that will give decisionmakers the ability to virtually test potential solutions to meeting future requirements. This will greatly enhance the Army's ability to transform its installations in the tight timeframe required to support our emerging forces. Much as field commanders gain a superior advantage by visualizing the battle space, installation planners will be able to make better strategic decisions by visualizing results of many different scenarios.

The U.S. Army Engineer Research and Development Center (ERDC) is conducting research and development in support of the Assistant Chief of Staff for Installation Management (OACSIM). The Fort Future tools will create a "system of systems" that unites existing and new computer models to form a "virtual installation." Building on data available from the Standard Army Management Information Systems (STAMIS) that provide a snapshot of the present, the Fort Future tools will use modeling and simulation to help decisionmakers explore potential consequences of their decisions.

Problem

Like the Warfighting Army, installations are transforming from their "as-is" capabilities to new capabilities necessary to "meet our combatant force requirements and soldier expectations." Appropriate sustainable planning is a component of transformation and includes the integration of mission essential task list (METL) analysis, installation support requirements, and various aspects of the planning process such as master, natural, and cultural resource planning.

* MG Robert L. Van Antwerp and MG Hans A. Van Winkle, "Transforming Installations To Serve the Army's Objective Force," *Army AL&T* (Headquarters, Department of the Army [HQDA], May-June 2002), accessible through URL: http://dacm.rdaisa.army.mil/



The Planning Tool Suite incorporates mission requirements and installation data with models and a simulation environment for holistic installation planning. In this example, a building has been added to test improvements to the deployment process offered by a new facility.

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To join together the numerous pieces of the planning process and to proactively plan to support current and future military activities, various tools must be developed and integrated through scientific practice, coordination, and technology.

Approach

A sustainable planning approach is required to ensure that the U.S. military has the facilities and resources to support future combat systems and training doctrine today and in the future. Integrated installation planning will leverage the Fort Future tools modeling and simulation capabilities to compare and contrast various scenario results, and to provide for optimal solutions.

An integrated approach is achieved through the use of various automated tools. The METL tool is used for requirement determination, and the "Virtual Installation" for the visualization of the initial conditions and the testing of potential courses of action.

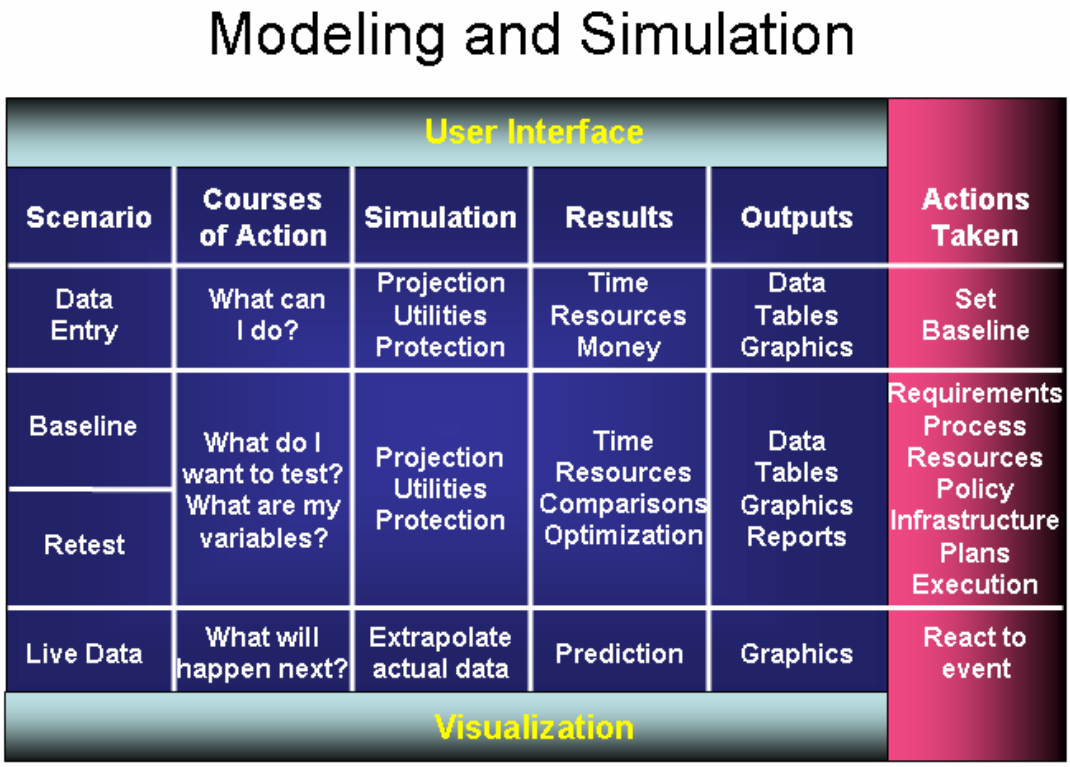
Mission Essential Task List (METL) & the Virtual Installation

The METL tool is both a requirements determination process and an assessment tool. It establishes a language and a process for installations to quantify their tenant support requirements and then measures how well they satisfy those requirements. Activities use the metrics established by the process to plan, monitor, analyze, and improve internal processes.

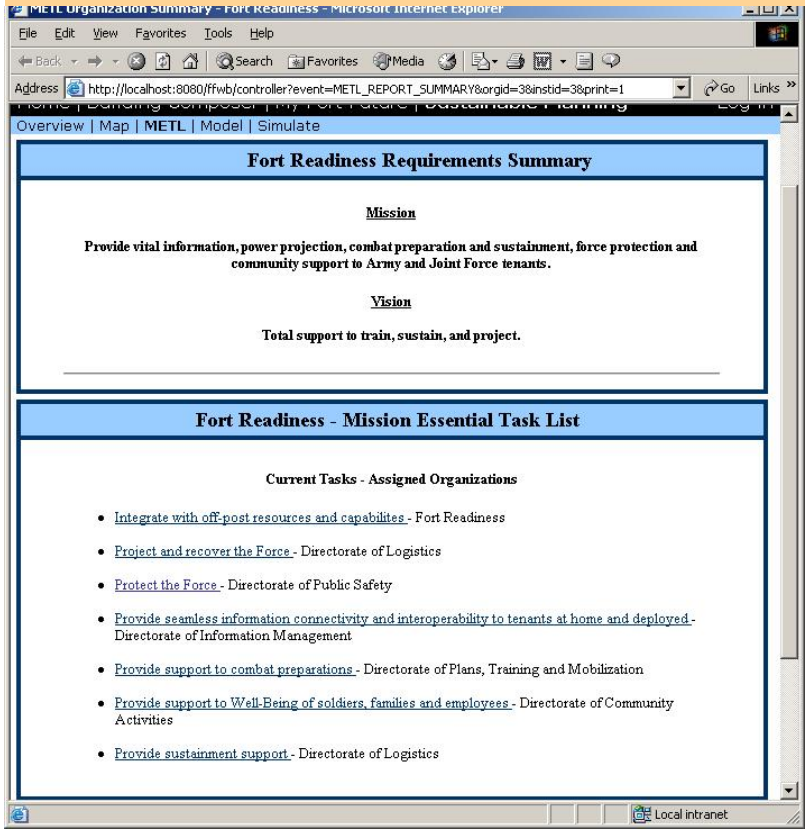
The planning process begins with the identification of requirements in support of the tenant mission(s). The tasks are then assigned to the organization responsible for the task and the facility that supports the requirement via the facility finder module.

This link between mission and facility allows for gap analysis in the capabilities of an installation. A mission critical building may have an unacceptable Installation Status Report (ISR) rating. By visualizing the mission critical tasks in association with the facility and its maintenance status—via the virtual installation—Garrison Commanders can see how the

Building the model and simulation begins with data entry to build the current installation baseline capabilities. From the baseline, decisions are made about what to test and what variables to change. The simulation is run and results analyzed. This is repeated until satisfactory results are obtained. Decision-makers can then take appropriate actions (process/resource change, etc). A separate initiative will test the applicability of inputting live data to predict outcomes of a real-time event or incident.



Mission Essential Task List (METL) tool for requirement identification, assignment of responsibility and gap analysis.



distribution of resources affects mission support.

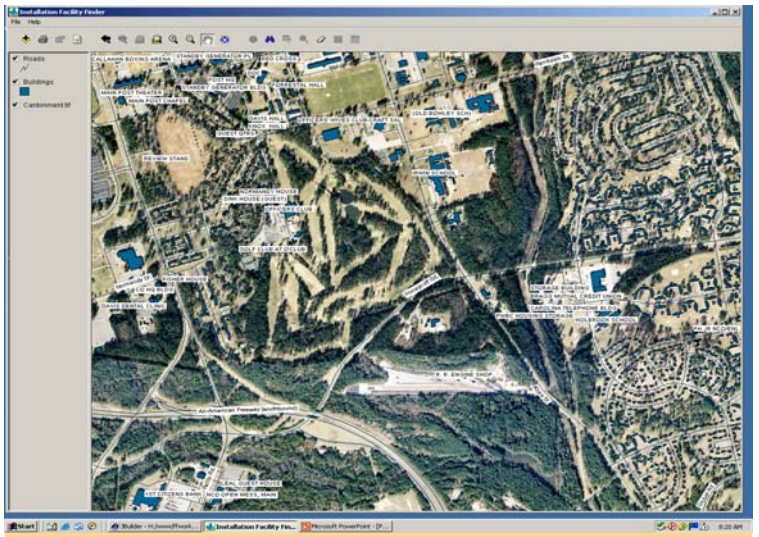
The virtual installation is also a mechanism for visualization of proposed courses of actions to support requirements. For example, one mission essential task is the ability to conduct virtual training in association with simulated and real time exercises. This requirement can be met by developing a Synthetic Theater of War (STOW) facility.

Potential site locations for the STOW are tested using the virtual installation. Planners can look at the proposed location in terms of specific requirements (best design and location for the actual facility) and for the way in which the facilities contribute to the installation's overall mission (i.e., "How does the facility design and location best enhance overall tenant mission/readiness?"). The virtual visualization of proposed actions will allow a more thorough examination of options in less time, with less cost. Additional requirements such as relation to other facilities, utility availability, design guide criteria, and force protection issues can be tested as well.

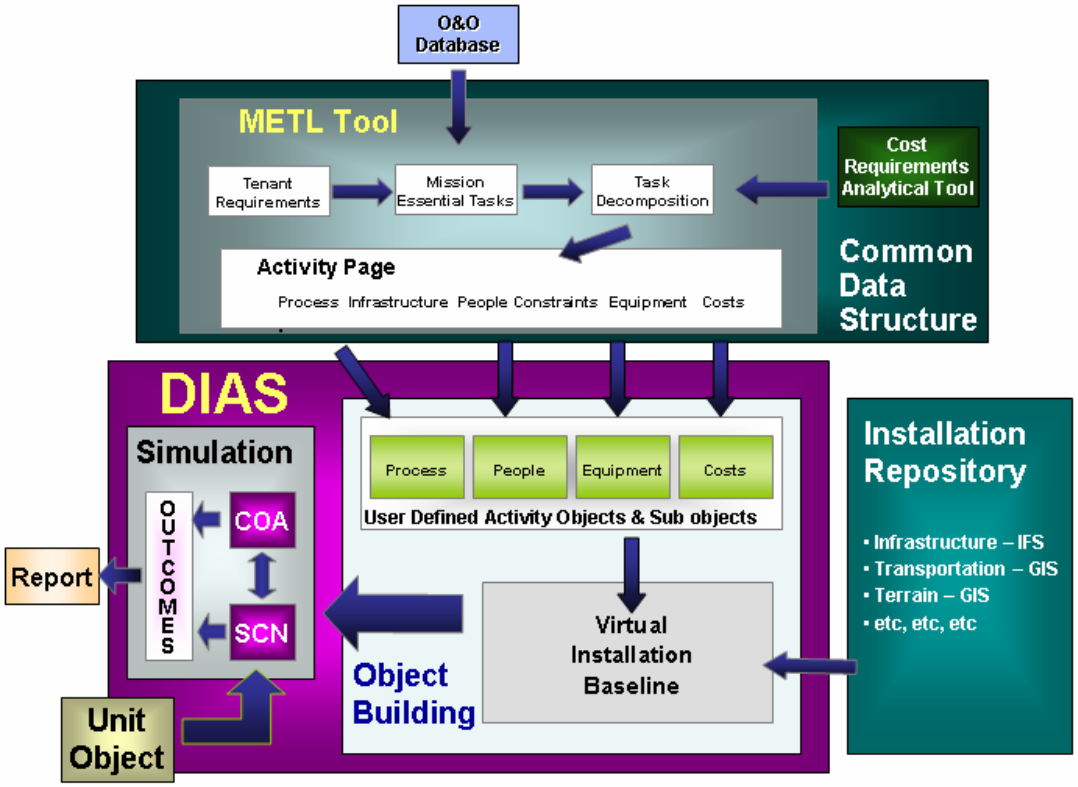
The Virtual Installation contains a simulation environment. The simulation environment draws from existing data on the installation (IFS, GIS, etc.) to build a computable model of the infrastructure. Process output and resource data is pulled from the METL tool to build a computable process object. These objects are linked to the virtual installation model creating the capability to simulate work and test various configurations.

While the simulation environment is in a prototype stage, the prototype has successfully met its proof of principle test. It successfully simulated a subset of the force projection processes used at Fort Bragg, NC. Work continues to expand its projection functionality toward the end state of being able to test an installations ability to project the future force within the 96-hour deployment window.

Additional functionality of the virtual installation and supporting simulation environment includes visualization of environmental concerns related to natural resource management practices, the simulation of utility load related to various events and new facility requirements, and impact of CBR models.



The Facility Finder Module allows the user to link METL tasks to the facilities necessary to support the task.



In this proof-of-concept diagram, METL and existing installation data are used to produce a computable model of the baseline installation and its processes. This "virtual installation" is created in a simulation environment that can test different scenarios and courses of action for an acceptable solution. With other Fort Future tools, alternate baselines can be established to test future scenarios or changes in force structure.

Benefits

The linkage of mission essential tasks, facility requirements, along with a simulation and visualization environment is critical to installation planners. Integrated installation planning, which will be available in October 2004, will enable users to:

- Facilitate planning to meet current and future installation tenant requirements
- Determine the individual facility requirements
- Categorize mission critical facilities
- Identify potential encroachment concerns
- Transform management practices before resource pressure becomes critical
- Mitigate potential areas of concerns.

Contacts

U.S. Army Engineer Research and Development Center

Kelly Dilks
E-mail: Kelly.M.Dilks@erdc.usace.army.mil
Phone: (217) 352-6511, X7472

Thomas Bozada
E-mail: Thomas.A.Bozada@erdc.usace.army.mil
Phone: (217) 352-6511, X7532

Dr. Michael Case
E-mail: Michael.P.Case@erdc.usace.army.mil
Phone: (217) 373-7259
FAX: (217) 373-7222
URL: http://ff.cecer.army.mil/

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